

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

PREPARED FOR CLIENT:

THEEWATERSKLOOF MUNICIPALITY

PREPARED BY:

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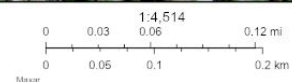
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Proposed Integrated Rural Development Programme (IRDP)



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 Municipal Boundary



Maxar | ArcGIS Web AppBuilder
Theewaterskloof GIS Department | Municipal Demarcation Board (MOB) | Municipal Demarcation Board | Maxar |



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ABREVIATIONS

DEA&DP.....	Department of Environmental Affairs and Development Planning
EA	Environmental Authorisation
EAP.....	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr.....	Environmental Management Plan
EO.....	Environmental Officer
ESO	Environmental Site Officer
I&AP.....	Interested and Affected Parties

DEFINITIONS

Biodiversity - The rich variety of plants and animals that live in their own environment. Fynbos is a good example of rich biodiversity in the Western Cape.

Corrective (or remedial) action - Response required addressing an environmental problem that is in conflict with the requirements of the EMPr. The need for corrective action may be determined through monitoring, audits or management review.

Environment - Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings.

Impact - A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Mitigation - Measures designed to avoid, reduce or remedy adverse impacts

Natural environment - Our physical surroundings, including plants and animals, when they are unspoiled by human activities.

Recycling - Collecting, cleaning and re-using materials.

Waste Management – Classifying, recycling, treatment and disposal of waste generated during construction and decommissioning activities.

REFERENCES

DEAT (1992) Integrated Environmental Management Guideline Series, Volumes 1-6, Department of Environmental Affairs, Pretoria.

DEAT (2004a) Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Department of Environmental Affairs and Development Planning Generic Environmental Management Plan Guideline, prepared by Strategic Environmental Focus, 2007

Lochner, P. 2005. Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

National Environmental Management Act 107 of 1998 (NEMA)

An Environmental Management Programme (EMPr) must comply with section 24N of the National Environmental Management Act (NEMA), 107 of 1998

Details and experience of the Environmental Practitioner who prepared the Environmental Management Programme (EMPr)



Melun Margaret Jeptha

Designation: Environmental Consultant

Overview

Name of Firm	Ohana Environmental Consultants
Contact details	melun@ohanaenviro.co.za
Name	Melun Margaret Jeptha
Date of Birth	22/11/1986
Tertiary Qualification	B Tech (Environmental Management), CPUT, 2012. Diploma (Environmental Management), CPUT, 2010.
Professional Registration	Professional Natural Scientist, SACNASP (116296)

Areas of Expertise

Melun Jeptha is a disciplined, goal driven and result orientated professional who is passionate about the environmental planning landscape within South Africa. She considers her work in the environmental management field to be one of her greatest callings. In her work she chooses to lead with purpose and integrity at all times. Melun has eight years' experience in the field of environmental management where she has worked within a variety of sectors including the built environment, coastal infrastructure, agriculture and residential developments. Melun has prepared Environmental Impact Studies during the planning stages of new developments and environmental management plans as part of the construction and operational stage of developments.

Areas of expertise include (but are not limited to):

- Project Management /Preparation of Environmental Impact Assessment
- Understanding of Aquatic ecosystems

- Environmental Management Plans/Programmes, Compliance auditing
- Facilitation of the Public Participation Process
- Maintenance Management & Rehabilitation Planning

Summary of Employment

September 2017 to Present Environmental Practitioner, Ohana Environmental Consultants, Hermanus

July 2016 to September 2017 Centre Manager, Environmental Programmes, Hawston e-centre, Hermanus

June 2015 to December 2016 Environmental Officer, Overstrand Municipality, Hermanus

Language Proficiency

	Speak	Read	Write
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

SECTION 1 - INTRODUCTION AND BACKGROUND

1.1) Construction of the Integrated Rural Development Programme, Greyton Erf 595

Theewaterskloof Municipality has appointed Ohana Environmental Consultants as independent environmental practitioner to facilitate the environmental impact assessment process and to compile an Environmental Management Programme (EMPr) for the construction of the Integrated Rural Development on a 6 ha portion of Erf 595 in Greyton. The development entails the expansion of low cost integrated housing to the beneficiaries of the local area. The infrastructure upgrades are scheduled for construction in parallel with the housing developments. The construction process will include the development of 548 homes, for the Greyton Housing project that includes the construction of a new bulk sewer pipeline, upgrade of the Greyton Waste Water Treatment Works (WWTW) and the utilisation of the 11 KV power line located on terrain.

Locality Map

The project entails the development of approximately 548 residential erven, public open spaces and community facilities on a 6 ha Portion of Erf 595 in Greyton. The closest town of Genadendal is about 7 km from Greyton and Caledon, the main town of the Theewaterskloof Municipality, is situated 35 km from Greyton. Erf 595 measures approximately 1425 ha in extent and only a portion of approximately 6 hectare will be used for the Proposed Low Cost Housing Project. The Erf is accessible from Dennegeur Street and two unnamed gravel roads.



Figure 1: Locality map of the proposed development footprint

In order to efficiently monitor the undertaking of construction activities and its impact on the environment, an Environmental Management Programme (EMPr) is required to direct and guide the Applicant and the appointed Contractors. The key objective of the EMPr is to identify all potential environmental impacts and to advise on avoidance, management and expected outcomes of each impact and its positioning within the development footprint in proximity to its immediate surroundings.

The appointed Contractor will use this Planning Environmental Management Programme (EMPr) as a tool in managing the impacts and controls related to the new development.

1.2) Legislation

This document is guided by Government Notice No 40772, Appendix 4, Content of Environmental Management (EMPr) which is based on the amendments of the Environmental Impact Assessment Regulations, 2014 and Chapter 23 of the National Environmental Management Act (107 of 1998)

NATIONAL ENVIRONMENTAL MANAGEMENT PRINCIPLES-INTEGRATED ENVIRONMENTAL MANAGEMENT

General objectives

23. (1) The purpose of this Chapter is to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities,
- (2) The general objective of integrated environmental management is to~
- (a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;
 - (b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits and promoting compliance with the principles of environmental management set out in section 2;
 - (c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
 - (d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;
 - (e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and
 - (f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.

SECTION 2 – SITE SPECIFIC INFORMATION

2.1 PROPOSED ACTIVITY AND LOCAL CONTEXT

Ohana Environmental Consultants has been appointed by Theewaterskloof Municipality as the Environmental Control Officer for the construction of a proposed housing development in Heuwelkroon, Greyton. The construction works shall take place on a 6 hectare portion of Erf 595 in Greyton.

To access the property, take the R43 from the N2 as you come from Cape Town or Caledon. Drive along the R43, passing Genadendal and within 7 km you will arrive in Greyton; take the Heuwelkroon intersection on your left; take the first right into Plantation Street and from there you can access the property site via Park Street and within 100m the property can be accessed via foot on Dennegeur Street.

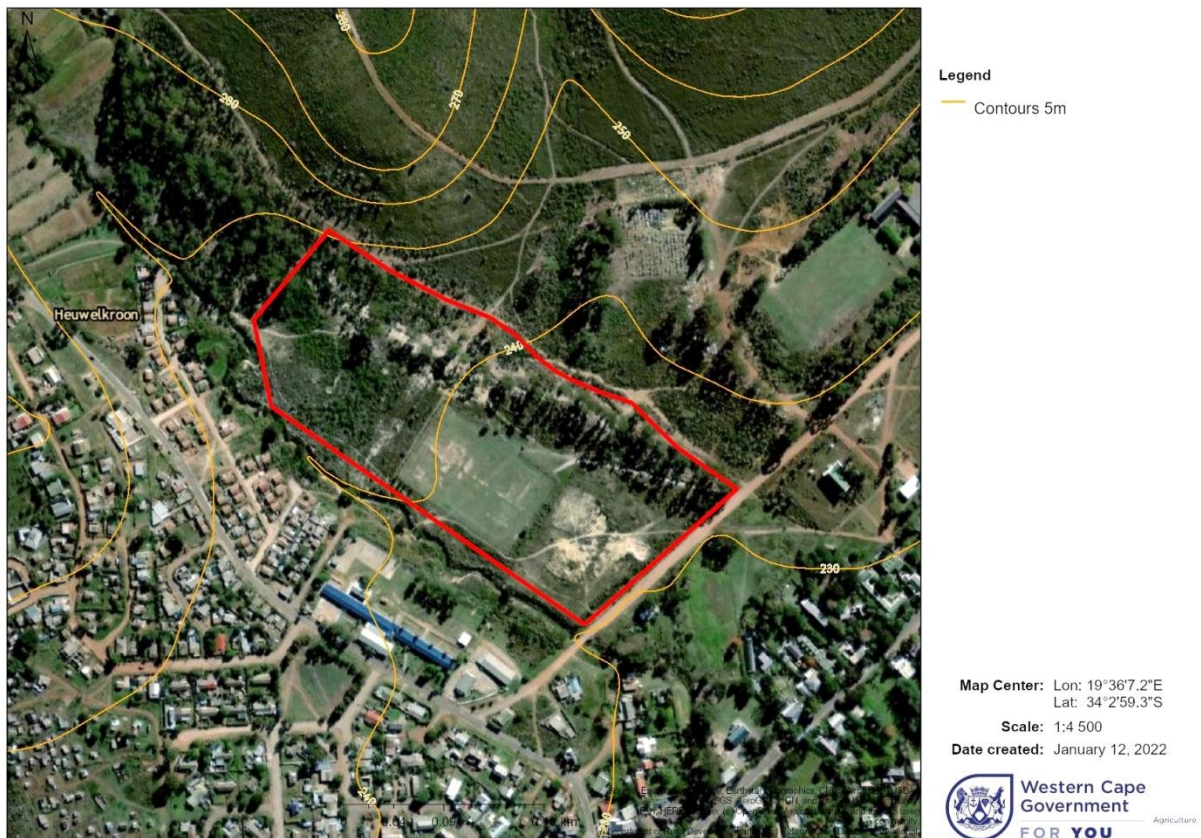


Figure 2: Proposed Development Footprint

SECTION 3- Summary of primary impacts associated with the proposed activity

3.1) Impact Management Actions

- Implement the method statements during every phase of development.
- Environmental Control Officer to be appointed to conduct environmental audits for the duration of construction. Responsible parties will be held accountable to remedy any areas of non-compliance.

- Construction activities remain within the confines of the development footprint to ensure no sign of damage to the roads or residential property during construction.
- Clear identification of no-go and buffer areas to prevent impact on vegetation; adjacent watercourse and flood lines.
- Observation of cultural, archaeological, paleontological and visual heritage.
- Create work opportunities for local people.
- Regulate the flow of traffic when doing work within existing roads.
- Pro-active waste management approaches, reduce, re-use and recycle, and as far as possible use locally sourced products.
- Pro-active use and management of water resources.

3.2) Impact management outcomes

- A buffer will be established to retain the interface as sensitive area between the watercourse and the development footprint. The buffer of 20-30 m will enhance the ecological value of the vegetation and prevent encroachment in the event of heavy rains that may widen the banks or cause erosion.
- The clearly defined boundaries will ensure that the contractor does not undertake work outside of the development footprint to prevent any potential damage to roads and private property. Ensure seamless traffic flow and management for vehicular access and pedestrian safety. Minimise impacts related to the noise during the construction process.
- Avoid/minimise the impact on vegetation and remove only the required vegetation. The contractor and workforce must ensure when the required vegetation is removed that the topsoil is stored for reinstatement. The invasive vegetation will be removed and disposed to prevent any potential veld fires. The vegetation that is removed should not be burnt on the property. A firebreak of 2 m along the northernmost border of the development footprint should be established.
- The management of litter and construction waste will be disposed on a weekly basis at the Greyton Transfer Station to ensure a clean and safe environment. The burning of waste is not permitted on the property.
- The development could pose a temporary visual impact and slight change in the character of the property; pockets of natural vegetation that supports an ecological support area will be retained as visual screen. Minor visual impacts in the form of visual alteration relating to the character of the site will occur during the construction phase.
- The heritage sites will be cordoned off/demarcated and observed while construction operations are underway and should anything of heritage significance be discovered, construction shall cease till the heritage specialist is called out to site.
- Keep development of houses away from the areas identified in the draft layout that are within the 1:100 and 1:50 year flood line to prevent risks during possible floods.
- The development will provide substantial positive benefits to the socio-economy of Greyton as the construction process shall create local employment opportunities.
- The project shall create substantial employment opportunities (temporary and permanent) and enable local skilled workers to acquire beneficial skills which could give

rise to future opportunities. The construction activities will strive to support the local economy and have a positive economic impact on the shops/industries within Greyton.

3.3) Management statements

- The Contractor will produce method statements within two weeks for each environmental control that is identified in the EMPr . The method statements will be reviewed within one week before the start of construction.
- Create clear demarcation and barricades along the construction footprint that states no public entry to identify the nature of work that is being undertaken.
- The demarcation for all no-go areas of 15 m and buffer areas of 20-30 m to avoid the impact on natural vegetation.
- The interface between the development and watercourse will have a well-defined buffer of 30 m before the commencement of construction.
- The development will take into account the flood lines (1:100; 1:50 year) as restricted areas.
- The accommodation of construction vehicles and pedestrian traffic along the existing road network and sidewalks will be maintained by following the rules of the road and the presence of traffic marshalls during permitted working hours of 08:00-17:00.
- The Contractor will provide and maintain hoarding areas, temporary traffic signs and warning lights to provide safety to the general public in the vicinity of the work area and entire site.
- A waste management plan will be put in place and implemented by the Contractor to manage the place of storage and disposal of waste produced during construction.
- People and businesses from the local community will be given first preference for work opportunities.
- All areas of heritage significance will be demarcated; a stop work order will be issued; until areas where heritage resources have been discovered are inspected to maintain heritage value.

3.4) Planning and design

- The first section of this EMPr is specifically compiled for the period of time prior to commencement of any activities associated with the construction of the proposed housing project.
- The final layout plan will be used during the planning stage of the development and this will assist with understanding the amount of houses, structures and their specifications; demarcation of the construction footprint and identifying all no-go areas and buffer areas.
- Construction to be planned in such a manner to ensure minimal impacts on natural environment during the clearing and removal of vegetation in the development footprint.

- Understanding of the development footprint its features and environmental sensitivities. Familiarising each role player with the property.

3.5) Pre-construction activities

- Identification and establishment of the Contractor site camp and holding area for construction materials.
- The Contractor may not commence construction activities before adequate provision has been made for accommodating traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.
- The boundaries of the site; no go areas; buffer areas; contractor camp ;eating areas; storage area; site office; ablution block must be identified and put in place prior to the commencement of construction.
- Environmental induction with the workforce to identify environmental impacts and risks and familiarising the workforce with the physical environment in which they will be working.
- The allocation of no go areas and buffer areas must be maintained during the construction of the houses, bulk sewer pipeline; upgrade of the wastewater treatment works; use of the 11 KV electricity line and upgrade of storm water systems.
- No significant negative environmental impacts are expected given that recommendations described in the EMPr are utilised during the construction phase.
- The appointed contractor must complete method statements of the proposed construction works in consultation with the Environmental Control Officer (ECO) prior to on site commencement.
- The method statements will be reviewed and approved by the Environmental Control Officer.

3.6) Construction activities

- The construction activities will be limited to the approved construction footprint as defined by the competent authority. The construction activities will only take place from Monday-Friday during normal work hours from 08:00-17:00.
- The clearing of vegetation will only take place within the development footprint. The construction process will not compromise the integrity of any existing environmental management priorities in the area.
- The topsoil should be stockpiled in a designated area next to the contractor camp and kept at a maximum height of 2 m. The topsoil as a valuable resource will be used for reinstatement at the end of construction.
- The Waste Management Plan should ensure a culture of waste minimization that aims to reduce, re-use and recycle shall be adhered to. Waste bins and a secure storage area for construction waste like cement bags should be provided on terrain.

- Water Resources should be managed to ensure that water is used only when necessary and re-use as far possible. The use of recycled water should be used as alternative for construction activities e.g. mixing of cement and dust suppression.
- Road surfaces should be kept clean during construction and excavations or trenches need to be clearly cordoned off with fencing material. An oil bund of 2 m with a impervious floor should be established for the storage of hazardous materials.
- When invasive vegetation is removed it should be temporarily stored in the designated stockpile area and dispose of at the Theewaterskloof Municipalities drop off facility located in Greyton.

3.7) Rehabilitation/Reinstatement

- Topsoil that has been removed must be temporarily stockpiled until construction has been completed. The topsoil should be used to reinstate the disturbed areas where construction has taken place.
- In areas where vegetation should not have been removed these areas will be rehabilitated with plants that are found in the area.

3.8) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution

- Avoid the disposal of construction materials in the municipal storm water system or watercours.
- The burning of waste within the development footprint is not permitted.
- Avoid construction works outside of the development footprint.
- Minimise the impact on vegetation by ensuring that equipment is not parked on vegetated areas.
- Machinery, equipment should be in a good working condition so that it does not emit smoke or gasses. Ensure that drip trays are in place while the machine is doing work and when the machinery is stationary.
- Control and manage waste/littering by storing the waste in the designated storage area to prevent pollution.

3.9) Monitoring the implementation of the impact management actions

- Monitor the implementation of the approved method statements for the duration of the development.
- Ensure that no-go and buffer areas are visible and put in practice to prevent impact on vegetation; adjacent watercourse and flood lines.
- Monitor the amount of local people that are employed.

- From a site inspection it is observed that construction activities are within the confines of the demarcated development footprint
- The site agent should monitor the movement of construction vehicles to prevent damage to roads and properties. Damages to roads or properties should be noted and rectified immediately. Maintain a complaints register that is used for complaints from landowners.
- Traffic signs that display construction is underway, minimum speed are in place and flag marshalls directs the flow of traffic.
- Observation and regards for cultural, archaeological, paleontological and visual heritage found on the property.
- The monitor the use of water for by obtaining water readings and determine the use of recycled water for construction activities,
- The Contractor/Site Agent should complete a weekly environmental checklist and submit it to the Environmental Control Officer.
- Maintain a record of waste receipts when waste is disposed at the Municipal Drop off Facility and provide the ECO with the receipts in order to monitor the disposal of waste.
- The appointed Environmental Control Officer should monitor the construction site on a monthly basis and provide a monthly environmental audit report to the applicant and all role players. The responsible parties will be held responsible to remedy areas of non-compliance.

3.10) Role players and responsibility matrix

- In order for the Environmental Management Programme (EMPr) to be successfully implemented, all the role players involved in the project need to co-operate.
- For this to happen, role players must have a clear understanding of their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication. In essence, these role players may include the Local; District; Provincial Authorities (A), Consulting Engineers (CE), Contractor (C), Site Agent (SA), Specialists, Resident Engineer, Environmental Control Officer (ECO) and Project Manager (PM).

3.11) Impact Management actions timeline

- Planning: final layout plan will be used to determine the amount of houses, structures and their specifications; demarcation of the construction footprint and identifying all no-go areas and buffer areas. Construction planning to ensure minimal impacts on the natural environment during the clearing and removal of vegetation in the development footprint. Role Players understand the development footprint and environmental sensitivities.
- Pre-construction: identification of the Contractor site camp and holding area for construction materials. Provision has been made for accommodating traffic in accordance with South African Road Traffic Signs Manual. The boundaries of the site; no go areas;

buffer areas; contractor camp ;eating areas; storage area; site office; ablution block are identified. Environmental induction is completed with the workforce to identify environmental sensitivities of the area. The contractor has submitted all method statements of the proposed construction works to the Environmental Control Officer (ECO).

- Construction: The construction activities will only take place from Monday-Friday during normal work hours from 08:00-17:00. The clearing of vegetation will only take place within the development footprint. The topsoil should be stockpiled in a designated area next to the contractor camp and kept at a maximum height of 2 m. The Waste Management Plan should be implemented. Water Resources should be well managed. Recycled water should be used as alternative for construction activities e.g. mixing of cement and dust suppression.
- Monitoring: Method statements are approved for the duration of the development; no-go and buffer areas are visible and put in practice to prevent impact on vegetation. Maintain a complaints register that is used for complaints from landowners. Traffic signs that display construction is underway is in place. The Contractor/Site Agent should complete a weekly environmental checklist and submit it to the Environmental Control Officer.

3.12) Environmental management policy and commitments

- The Contractor understands the importance of conserving the environment, and will endeavour to apply with the measures of this Environmental Management Programme (EMPr) and the approved environmental authorization; mitigation measures to conserve and maintain sensitive areas and prevent environmental degradation.

3.13) Interpretations

- The implementation of the EMPr is a requirement for the proposed development. The Environmental Management Programme (EMPr) is legally binding through the National Environmental Management Act (NEMA). This EMPr is to be used during the planning and construction phase of the development. The appointed Environmental Control Officer (ECO), will use this EMPr as a measure of progress during the completion of Environmental Control audits.

SECTION 4 – ENFORCEMENT, MONITORING AND AUDITING

4.1) PRE-CONSTRUCTION AND CONSTRUCTION PHASE

- The independent Environmental Control Officer (ECO) is responsible for environmental induction training of the workforce, drafting of monthly environmental audits to monitor

compliance with the Environmental Management Programme (EMPr). The ECO shall conduct independent environmental audits to verify the project compliance with the EMPr. Before any construction activities commence, the ECO must compile an audit checklist based on the contents of this EMPr.

Evidence of the following as **key performance indicators**, must be included in the audit reports:

- ❖ Complaints received from landowners and actions taken.
- ❖ Environmental incidents and actions taken.
- ❖ Environmental damage that may need rehabilitation measures to be taken.
- A copy of the method statements must be held by the Contractor/Site agent on site and be made available to the Department and ECO if so requested.
- As determined by the client the ECO shall conduct a monthly site visit and compile an environmental control audit report for the duration of the project.
- The contractor/site agent shall complete weekly contractor checklist and send it to the ECO. The ECO must compile, for the approval by the client, an audit checklist based on the contents of this EMPr.
- The ECO shall upon request forward one (1) monthly site audit report during the construction period to all the relevant role players.
- The ECO will provide feedback on environmental matters during monthly progress meetings with the clients and all role players. During the operational phase the ECO will do quarterly environmental audits.
- The minutes of site meetings, will be the official record of environmental activities, complaints and communications. These minutes will be circulated to the entire project team.

SECTION 5: COMMUNICATION

5.1) MEASUREMENT AND PAYMENT

- It is understood that environmental requirements included in this EMPr will entail costs over and above those of the construction. These include provision for: training and environmental awareness; monitoring; auditing; and corrective actions.

5.2) AWARENESS TRAINING

5.2.1 Pre-Construction Phase

- The ECO is responsible to ensure that the workforce and engineers on site, are given an **environmental awareness induction session** which clearly defines environmental sensitivities; details the local environment and outlines the requirements of the EMPr as a management tool to protect the environment.

- Environmental induction and awareness training will be done before construction commences and refresher courses will be done during the course of the project. During the training a document of environmental risks and hazards will be provided to the contractor.
- An environmental file, maintained by the ECO will remain on site as reference to the contractor for briefing of the workforce to attend to any areas of non-compliance.

5.3) SITE DOCUMENTATION

5.3.1) Construction Phase

The following is a list of documentation that must be held on site and must be made available to the ECO and/or relevant role players on request.

- ❖ Daily instruction book
- ❖ Method statements
- ❖ Environmental Management Programme (EMPr)
- ❖ Complaints register
- ❖ Induction registers

5.4. Pro forma documentation

5.4.1) Prior to the commencement of construction activities

- The pro forma documentation (that will be discussed with the Contractor and provided by the ECO) are to be filled out and is binding to the EMPr and project contract.

5.4.2) During construction activities

The following pro forma documentation is to be filled out and maintained. These are binding to the EMPr and project contract. They include, but are not limited to, the following:

- ❖ Environmental incidents
- ❖ Records of all remediation / rehabilitation activities

5.5 TOLERANCES AND NON-COMPLIANCE

The independent ECO is responsible for monthly audits on compliance to relevant environmental legislation, and the EMPr for the project.

- The ECO shall conduct independent environmental audits. Should the contractor show repeated non-compliance in terms of the audits, a range of fines may be issued to the contractor. These fines are included as part of the Construction EMP (see Table 8).
- The Engineer together with the ECO shall decide as to what constitutes a transgression in terms of this clause, subject to the General Conditions of Contract.

SECTION 6 - CONSTRUCTION PHASE EMP - IMPLEMENTATION

6.1 PREAMBLE

- The point of departure for the EMPr is to enable a pro-active rather than re-active approach to environmental management by addressing potential problems before they occur. This will limit corrective measures needed during the construction phase of the project. Therefore the purpose of this EMP is to provide management measures that must be implemented by Theewaterskloof Municipality and the contractor to ensure that the potential impacts of construction are minimised.
- It must also be ensured that the *EMPr is maintained and upheld as a dynamic document* in order for the *project team to add or improve on issues* that might be considered left out or not relevant to the project. The tables below will form the core mitigation measures appropriate to the pre-construction and construction phase.
- The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project.
- The '**pre-construction**' section of this EMPr, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustain optimal environmental performance throughout the construction phase.
- The majority of environmental impacts will have immediate effect during the '**construction**' phase (e.g. ecological, visual, traffic). These impacts will then be mitigated through the measures outlined below, together with a commitment to sound environmental management from the project team.
- The "construction" section refers to all construction activities that will occur within the approved area and access roads, until the project is completed.

6.2 STRUCTURE AND CONTENTS OF THE TABLES

The table consists of seven parts as follows:

"Phase of development" - This row identifies either pre-construction or construction phase.

"Impact / issue" - This row identifies the issue being addressed, e.g. Materials, site demarcation.

Mitigation Measure - This column includes all the necessary mitigation measures for each impact/issue'.

Management objectives - This column indicates what the management objectives are to be achieved for each mitigation measure.

Measurable targets - This column indicates what evidence is to be used as an indication to whether or not the 'Management objectives' have been implemented.

Responsible party - This column provides the information as to which role player, e.g. ECO, RE, is responsible for the implementation of each mitigation measure.

Frequency of action - These columns provides the time guidelines for the 'Responsible party' by which he/she is to action or manage the required mitigation.

6.2.1 RECOMMENDATIONS

Pre-Construction and Construction Phases

Additional space has been provided below the table's space for impacts that may arise during the construction phase and any recommendations that need to be addressed during the pre-construction and construction phases.

3.14) Planning and design

- The first section of this EMPr is specifically compiled for the period of time prior to commencement of any activities associated with the construction of the proposed housing project.
- The final layout plan will be used during the planning stage of the development and this will assist with understanding the amount of houses, structures and their specifications; demarcation of the construction footprint and identifying all no-go areas and buffer areas.
- Construction to be planned in such a manner to ensure minimal impacts on natural environment during the clearing and removal of vegetation in the development footprint.
- Understanding of the development footprint its features and environmental sensitivities. Familiarising each role player with the property.

3.15) Pre-construction activities

- Identification and establishment of the Contractor site camp and holding area for construction materials.
- The Contractor may not commence construction activities before adequate provision has been made for accommodating traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.
- The boundaries of the site; no go areas; buffer areas; contractor camp ;eating areas; storage area; site office; ablution block must be identified and put in place prior to the commencement of construction.
- Environmental induction with the workforce to identify environmental impacts and risks and familiarising the workforce with the physical environment in which they will be working.

- The allocation of no go areas and buffer areas must be maintained during the construction of the houses, bulk sewer pipeline; upgrade of the wastewater treatment works; use of the 11 KV electricity line and upgrade of storm water systems.
- No significant negative environmental impacts are expected given that recommendations described in the EMPr are utilised during the construction phase.
- The appointed contractor must complete method statements of the proposed construction works in consultation with the Environmental Control Officer (ECO) prior to on site commencement.
- The method statements will be reviewed and approved by the Environmental Control Officer.

3.16) Construction activities

- The construction activities will be limited to the approved construction footprint as defined by the competent authority. The construction activities will only take place from Monday-Friday during normal work hours from 08:00-17:00.
- The clearing of vegetation will only take place within the development footprint. The construction process will not compromise the integrity of any existing environmental management priorities in the area.
- The topsoil should be stockpiled in a designated area next to the contractor camp and kept at a maximum height of 2 m. The topsoil as a valuable resource will be used for reinstatement at the end of construction.
- The Waste Management Plan should ensure a culture of waste minimization that aims to reduce, re-use and recycle shall be adhered to. Waste bins and a secure storage area for construction waste like cement bags should be provided on terrain.
- Water Resources should be managed to ensure that water is used only when necessary and re-use as far possible. The use of recycled water should be used as alternative for construction activities e.g. mixing of cement and dust suppression.
- Road surfaces should be kept clean during construction and excavations or trenches need to be clearly cordoned off with fencing material. An oil bund of 2 m with a impervious floor should be established for the storage of hazardous materials.
- When invasive vegetation is removed it should be temporarily stored in the designated stockpile area and dispose of at the Theewaterskloof Municipalities drop off facility located in Greyton.

Table 1: Impact Mitigation during the Planning Phase for Construction of the integrated housing development on Erf 595, Greyton

Phase of development:	Planning			
Impact:	General			
Mitigation measure	Management objective	Targets	Responsible Party	Frequency of action items
<u>Project initiation and commencement</u> Understanding of the environmental management programme and conditions for construction activities. Method statements to be compiled three weeks before the start of construction.	The professional team is made aware of the approved environmental Management Programme (EMPr). Method statements are compiled by the contractor for review and approval by the Environmental Control officer (ECO)	Workforce has an understanding of the construction footprint. Method statements are approved.	ECO, Contractor, Engineer	Beginning stage of the project, as required
<u>Project documentation</u> Final layout plan and environmental authorisation are provided to the Contractor	The layout guides the identification of the footprint where construction will take place.	The contractor's team starts planning and determines from the layout how the development is best scheduled.	Contractor, Engineer	During planning

<p><u>Traffic Impact</u></p> <p>Comply with all rules and signs of the road. Traffic disturbances are to be minimized.</p>	<p>Reduce the impact on traffic to an acceptable standard. Entrance and exit of the site are clearly defined to assist the regulation of traffic. Determine how access will be best provided on site.</p>	<p>The rules of the road are obeyed and no complaints from the public.</p>	<p>Site agent to maintain contact with Overstrand ,Municipal traffic officials</p>	<p>As often as required</p>
<p><u>Emergencies, non-compliance and communication.</u> The contractor must provide method statements on the protocols to be followed before the commencement of construction.</p>	<p>Contingencies for minimising negative impacts anticipated to occur during the construction phase. The public is not allowed to enter the construction area.</p>	<p>Provision of Method statements. The ability to handle any emergencies is cleared upfront. No public on site.</p>	<p>Contractor, Engineer</p>	<p>As and when required</p>
<p><u>Demarcation</u></p> <p>Identify the development footprint.</p>	<p>Environmental sensitivities; vegetation; no go areas and buffer areas are identified.</p>	<p>The contractor's team can structure a work plan based on the environmental sensitivities.</p>	<p>Contractor, ECO</p>	<p>During the planning phase</p>

Table 2: Impact Mitigation during the Pre-Construction Phase for Construction of the integrated housing development on Erf 595, Greyton

Phase of development:	Pre-construction			
Impact:	General			
Mitigation measure	Management objective	Targets	Responsible Party	Frequency of action items
<u>Method Statements</u> The method statement for environmental issues has been submitted to the Environmental Control Officer.	The method statements are reviewed by the ECO and revised by the contractor if necessary.	The method statements are approved and in use.	Contractor/ECO	Need to be in place before construction.
<u>Construction Management</u> The contractor/ECO will take cognisance with regard to weather forecasts and prepare/maintain the construction area. Preferred area where material and equipment could be kept need to be identified in consultation with the ECO.	Minimise construction footprint, scarring of soil surfaces and land features where work will take place Minimise disturbance and loss of biodiversity.	No visible erosion scars once construction is completed. The footprint has not exceeded the agreed footprint. No signs of erosion and method statements are adhered to.	Contractor / ECO	As and when required

<p><u>Contractor Camp</u></p> <p>Identify and establish contractor camp materials holding area and eating areas.</p>	<p>The area will be used for storage of construction materials, machinery and waste.</p>	<p>A dedicated holding area is provided. The contractor camp and eating areas are kept clean and organised.</p>	<p>Contractor/Site Agent</p>	<p>As and when required</p>
<p><u>Traffic Impact</u></p> <p>Provision is made for vehicular access and accommodating traffic to the property.</p>	<p>Making use of the South African Road Traffic Signs Manual to direct access and flow of traffic onto the site.</p>	<p>The efficient flow of traffic and there is no congestion. Traffic signs for entry and exit to the site are visible.</p>	<p>Contractor/Site agent</p>	<p>As often as required</p>
<p><u>Demarcation</u></p> <p>Demarcate the boundaries; no-go areas; buffer areas of the site.</p>	<p>Fencing of construction boundaries, no-go areas of 15 m and buffer areas of 20-30 m are demarcated with construction netting.</p>	<p>The workforce will not enter and construction does not take place in these areas.</p>	<p>Contractor/Site agent</p>	<p>To be checked on a daily basis.</p>
<p><u>Environmental Awareness</u></p> <p>The workforce and engineers are provided with an environmental awareness and induction.</p>	<p>The workforce is familiar with the environment in which they will be working and the environmental impacts and sensitivities of the area.</p>	<p>The workforce does not enter and conduct work in sensitive areas.</p>	<p>Contractor, ECO, workforce.</p>	<p>To be checked on a daily basis.</p>

Table 3: Impact Mitigation during the Construction Phase of the integrated housing development on Erf 595, Greyton

Phase of development:	Construction			
Impact:	Plant (Materials)			
Mitigation measure:	Management objective	Targets	Responsible Party	Frequency of action items
<u>Materials</u> All construction materials (sand; rock; pipes) will be stored in a designated area within the contractor camp.	Handle materials to minimise scarring of the soil surface and land features. Materials are neatly stored according to their type.	No visible scars once construction is completed. The contractor camp is well kept.	Contractor, ECO to ensure compliance.	Daily as required
<u>Oil and chemicals</u> The contractor must provide method statements for the "handling & storage of oils/ chemicals", "fire", and "emergency spills procedures".	Refuelling of machinery should take place off site or in a bunded area that is exclusively for refuelling of machinery. Minimise chances of transgression of the environmental acts controlling pollution. An emergency spill kit and fire extinguisher is present on site.	No pollution of the environment. Method statements provided and followed through.	Contractor /ECO to ensure compliance	Daily as and when required

<p><u>Earthmoving machinery</u></p> <p>The machines need to be stored in an area with an impervious surface. The machinery need to be equipped with drip trays while working and when stationary.</p>	<p>Prevention of accidental spills and scarring of the soil surface. The machines should be switched off when not in use.</p>	<p>No pollution of the surrounding environment due to oil spills.</p>	<p>Contractor/Site Agent</p>	<p>Daily as and when required.</p>
<p><u>Tools and equipment and its maintenance</u></p> <p>The tools and equipment need to be kept in a secure and lockable area and the work area should be restricted to allocated persons.</p>	<p>Tools and equipment are safely stored. No unauthorised access and maintain tools in a workable condition.</p>	<p>No accidents to the workforce or public.</p>	<p>Contractor/Site Agent/Workforce</p>	<p>Daily monitoring.</p>
<p><u>Heritage and Cultural</u></p> <p>Observance to avoid disturbance of resources that include Visual/Archaeological/ Paleontological/ should be avoided.</p> <p>The development will alter the visual character and appearance of the site.</p>	<p>Identification and demarcation of heritage sites. Visual screening can be supported by maintaining vegetation that does not require removal.</p>	<p>Maintaining a vegetation screen. No disturbance or impact on heritage resources.</p>	<p>Contractor, Site Agent, ECO, Heritage Specialist ECO to monitor during site inspections.</p>	<p>Daily monitoring</p>

	Identification of heritage sites and the demarcation of it.	No signs of heritage disturbances.	Specialists and ECO	As and when required
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Table 4: Impact Mitigation during the Construction Phase of the integrated housing development on Erf 595, Greyton

Phase of development:	Construction			
Impact:	Construction			
Mitigation measure	Management objective	Targets	Responsible Party	Frequency of action items
<u>Safety and Security</u> All fencing on site must be managed in terms of the Fence Act No. 31 of 1963 Maintenance and repair work must be done in accordance with National Building Regulations and Standards Act 103 of 1977.	Maintenance work shall not cause environmental damage. Any environmental damage caused must be investigated and mitigated immediately. Reduce the risk of potential incidents. Minimise litigation and complaints.	No complaints from surrounding residents and businesses.	Applicant, ECO If ECO is appointed	As & when needed

<p><u>Toilets and ablution facilities</u></p> <p>The contractor will be responsible for providing all sanitary arrangements for his team. A minimum of one chemical toilet shall be provided per 15 persons.</p>	<p>Ensure proper sanitation is provided and maintained.</p> <p>Minimise potential to pollute soils and water resources.</p>	<p>Workforce makes use of toilets provided. No complaints received from the public or members of the workforce. No visible or measurable signs of pollution of the environment.</p>	<p>Contractor, RE or ECO</p> <p>ECO to ensure compliance</p>	<p>Daily monitoring</p>
<p><u>Waste Management</u></p> <p>Waste should be stored in a designated and secure area and follow the correct route of disposal. A culture of Waste Minimization is adopted that strives to reduce; re-use and recycle.</p>	<p>Management of waste should take place by recycling and proper discarding of waste, while keeping the site neat and tidy. Minimise complaints by the public. Minimise potential to pollute soil surfaces sand, water resources and natural areas.</p>	<p>Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site. Bins/skips are provided to temporarily collect and dispose of waste on a weekly basis.</p>	<p>Contractor, ECO</p> <p>ECO to ensure compliance</p>	<p>Daily monitoring</p>
<p><u>Maintenance of working area</u></p> <p>The contractor must provide and maintain a method statement for "contractor camp maintenance and cleaning of the site".</p>	<p>Contractor camp should be kept clean and maintained on a regular basis. Workforce should wear gloves and safety goggles.</p> <p>Minimise chances of transgression of the acts controlling pollution e.g. Waste Management Act 59 of 2008.</p>	<p>No pollution of hazardous materials to enter the environment.</p> <p>No litigation due to transgression of pollution control acts.</p> <p>Method statements are implemented.</p>	<p>RE, Contractor, ECO to ensure compliance</p>	<p>Monitor daily</p>

<u>Noise</u> All construction vehicles must be in a good working order to reduce possible noise pollution. Work hours during the Construction Phase shall be strictly enforced unless permission is given (08H00 – 17H00).	Maintain noise levels below disturbing as defined in the National Noise Regulations. Minimise the nuisance factor of the development	No complaints from surrounding landowners or the general public.	Contractor, EO ECO to ensure compliance	As and when required

Table 4: Impact Mitigation during the Construction Phase of the development

Phase of development	Construction			
Impact:	Construction			
Mitigation measure	Management objective	Targets	Responsible Party	Frequency of action items
<u>Environmental sensitive areas</u> include the 1:100 year and 1:50 year flood lines and identification of areas where houses will not be built.	Buffer & no-go areas of 20-30m; Green corridors of 10-20 m will be retained between the watercourse and the development.	Management of invasive species to encourage natural establishment of Fynbos vegetation.	Specialists and ECO	

<p><u>Heritage and Cultural Aspects</u></p> <p>Disturbance of interference with any historical or heritage elements.</p>	<p>Identification and demarcation of heritage sites (if discovered). Heritage specialists, Heritage Western Cape are immediately informed.</p>	<p>No signs of heritage disturbances.</p>	<p>Specialists and ECO</p>	<p>As and when required</p>
<p><u>The development should be built in line with SANS10400, Building Regulations.</u></p>	<p>The contractor/engineer must ensure that the buildings are built according to the specification and SANS Building Regulations.</p>	<p>Inspections must be conducted to ensure that building specifications are adhered to. The site inspection documents are to be kept on file at the contractor site camp.</p>	<p>Contractor ECO to ensure compliance.</p>	<p>Monitor on a daily basis</p>
<p><u>Excavations & Trenches</u></p> <p>Excavations should be adequately sloped and not pose a danger to the workforce or public.</p>	<p>All excavations on site should have a fenced enclosure and consist of danger signage.</p>	<p>No incidents or complaints from the public.</p> <p>Monitoring will take place during the environmental control audits.</p>	<p>Contractor ECO to ensure compliance.</p>	<p>Monitor on a daily basis</p>
<p><u>Flora</u></p> <p>No open fires shall be allowed on site under any circumstances, under the Forest Act, 1984 (Act No. 122 of 1984).</p>	<p>Encourage workers to remain in the confines of the development footprint by exercising caution to protect the natural environment. Minimise risk of veld fires for nearby properties.</p>	<p>No visible erosion scars once construction is completed. All damaged areas successfully rehabilitated. No fires started by contractor's work force.</p>	<p>Contractor, ECO to ensure compliance</p>	<p>As and when required</p>

<p><u>Access routes /roads:</u></p> <p>Existing roads and services must be utilised thus reducing the infringement of construction on the external natural habitats.</p>	<p>Minimise any displacement of the natural environment.</p>	<p>No signs of erosion on access roads after completion of construction</p>	<p>Contractor, ECO to ensure compliance</p>	<p>As required, monitor daily</p>
<p><u>Crime, Safety and Security:</u></p> <p>No unidentified staff shall be allowed on site unless otherwise indicated by the Contractor.</p>	<p>Reduce the risk of potential incidences. Boundary fencing will serve to prevent public access to the site, for public safety and security reasons.</p>	<p>No incidences reported</p>	<p>Contractor, ECO to ensure compliance</p>	<p>Monitor on a daily basis</p>
<p><u>Biodiversity</u></p> <p>Western Cape's ecological infrastructure must be maintained and prevent ecosystem fragmentation and the loss of habitats. Inform municipalities and other land use planners. Promote the wise management of biodiversity</p>	<p>Retain the identified green corridors found on the north-eastern and north-western portion of the property. Keep no-go areas and buffer areas of 10-35 m between these natural areas and the development area.</p>	<p>Prevent fragmentation of indigenous vegetation that supports ecological areas. Retain green corridors that could support the buck population and various birds' species.</p>	<p>Contractor, ECO to ensure compliance</p>	<p>Monitor on a daily basis</p>

<p><u>Socio-economic</u></p> <p>Provision of housing opportunities and services</p> <p>Clean the watercourse adjacent to the development footprint. Protect ecological infrastructure services for the community. Skills advancement/training and work opportunities for local artisans.</p>	<p>Prevention contamination of potable water sources and watercourses. Give local people first preference for work opportunities and support the local sector of Greyton. Communities become an integral part of development through work opportunities and taking ownership for keeping their environment in a clean condition.</p>	<p>No sign/evidence of contaminated water.</p> <p>Local shops and labour are utilised.</p>	<p>Contractor, ECO to ensure compliance</p>	<p>As and when required</p>
<p><u>Air Pollution</u></p> <p>Dust particles in the air as a result of construction activities. Smoke coming from operating machines e.g. digger or excavator.</p>	<p>Dust suppression methods (damping dust with a water bowser, using recycled water) to be implemented and machinery to be in tip-top working condition to mitigate air pollution.</p>	<p>Good air quality control and no complaints from landowners or businesses throughout the whole construction process.</p>	<p>Contractor, ECO to ensure compliance</p>	<p>Monitor on a daily basis</p>

Table 5: Impact Mitigation, Tolerances during Construction of the development

Phase of development	Construction
Impact:	Tolerances
<p>Fines for the activities detailed below, will be imposed by the Engineer on the Contractor</p> <ul style="list-style-type: none"> a) Any employees, vehicles, related to the Contractor’s operations operating within the designated boundaries of a “no-go” area. R 3 000 b) Any vehicle driving in excess of designated speed limits. R 500 c) Persistent and un-repaired oil leaks from vehicles/machinery. R 2 000 f) Litter on site associated with construction activities. R 2 000 g) Deliberate lighting of illegal fires on site. R 2 000 h) Any employee eating meals on site, outside of the defined eating area. R 500 i) Employees not making use of the site ablution facilities. R 2 000 j) Failure to implement specified noise controls R 1 000 k) Failure to empty waste bins on a regular basis. R 1 000 m) Any act that in the reasonable opinion of the ECO constitutes a deliberate contravention of the requirements of the project specifications. R2 000 o) Any removal of vegetation not forming part of the EMP. R 10 000 p) Any negative impact on the surrounding property. R 15 000 <p>The Engineer, ECO shall determine on what constitutes a transgression, subject to the General Conditions of Contract.</p>	

Table 6: Other impacts that may arise

Phase of development:				
Impact:				
Mitigation measure	Management objective	Targets	Responsible Party	Frequency of action items